METAL-FACH

BALE WRAPPER
Z593

INSTRUCTIONS MANUAL – PART II

TRANSLATION OF THE ORIGINAL INSTRUCTIONS MANUAL

REV. II

OCTOBER 2018

Instructions Manual No. Z593-02-167/2013

Table of contents

PART II

The symbols used in these Instructions

DANGER

Hazard-warning symbol. This indicates the occurrence of a serious hazard condition, which, if not avoided, can result in death or serious injury. This symbol warns against the most-dangerous situations.

CAUTION

This symbol points to especially important information and recommendations. Non-compliance with the described recommendations risks serious damage to the machine due to its incorrect operation.

WARNING

This symbol indicates the possibility of the occurrence of a hazard, which, if not avoided, can result in death or serious injury. This symbol indicates a lower level of risk of injury than the symbol including the word “DANGER”.

This symbol indicates useful information.

This symbol indicates maintenance activities which should be performed periodically.

4. Bale-Wrapper operation

4.1 Preparing bales

Use balers to bale dried grass and other papilionaceae with a humidity of ca 60%. Ensure the bales are of regular tubular shape and appropriate compaction degree – see the Instructions Manual for the Baler.

Wrap bales in the field or in a yard intended for their storage, preferably virtually right after having baled them. Stack the wrapped bales in not more than two layers on a dry and smooth surface and verify the bales for full coverage with the wrapping film.

Leave the bales to ferment for 6 to 8 weeks in temperatures above zero. The haylage so made can be used to feed animals as wholesome fodder.

4.2 Film installation

Follow the below procedure to mount the film roll in the film feeder.

- Tilt the foil roll bracket and secure it with a hook attached to the pre-stretching unit
- Use the handwheel (crank) to unwind the lower pin clamping the film
- Set the height of the upper pin at the position corresponding to the film roll width of 500 mm or 750 mm
- Fit the film roll on the upper cone pin and press against the spring to embed the roll on the lower cone
- Wind the lower pin with the handwheel (crank) to tighten the roll which ensures its firm vertical retention
- Use the nut on the crank screw to secure the roll against spontaneous unwinding
- Install the film with its external gluey side towards the bale axle
- Drag the film band over the pre-stretchers following the diagram on the information pictogram (Fig. 17, Fig. 38).
- Once you have dragged the film band over the pre-stretchers, remove the hook which secures the film roll frame.
- Attach the end of the film band to a loaded bale.

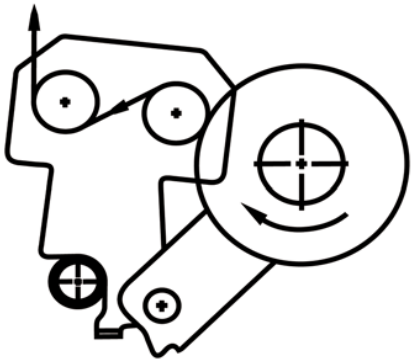

Figure 38. Film-flow diagram – top view

4.3 Wrap Counter

The L-02 wrapping counter is an electronic device which counts and informs the user about the number of turntable revolutions made, the end of wrapping, the number of bales wrapped, and statistics on efficiency and work time.

The counter is an electronic device used to count the bale wraps and can be used in all types of lever-controlled Wrappers.

Install the revolution counter in the tractor cab and ensure good visibility and display access.

Figure 39. L-02 Wrap counter

Protect the counter against moisture and excessive vibrations, impacts on the cab structure, and falls on hard surfaces in particular. You can use the magnetic fitting on the back wall of the counter to fix it.

The counter unit includes counter software in a plastic casing, revolution sensor, wire bundle, and multi-contact connection.

CAUTION

CAUTION!

Do not expose the counter to moisture, chemical agents, direct precipitation, frost, temperature over 500ºC, or the strong effects of sunlight

4.3.1 Switching the counter on and off

A flashing red light on the display indicates the correct configuration of the rev-counter system.

Press and hold the ON push button marked with letter C to switch on the counter. Each time the counter is switched on, the display and power supply are tested (Section 2.7.1). A positive counter test indicates that it is ready for operation using the settings entered during a previous activation.

Press and hold the OFF push button marked with letter C to switch off the counter until a red flashing light appears on the display (for approx. 3 seconds). You can disconnect the counter unit system after this signal.

4.3.2 Rotation sensor

Use the lighter socket plug to connect the rotation sensor, which is installed in the tractor cab, to a power supply (12V), and a dedicated wire bundle to connect it to the revolution counter.

Mounted on a fixed section of the Bale Wrapper, the rotation sensor works with a fixed magnet fitted on the rotative frame to transmit pulses to the revolution counter. Each bale revolution is counted and shown on the revolution counter display.

After a pre-set number of revolutions is counted, the counter signals wrapping is stopped by emitting a sound.

The counter can be pre-set to wrap from 10 to 49 times.

CAUTION

CAUTION!

Protect the installed wire bundle which connects the revolution sensor to the revolution counter against accidental mechanical damage.

CAUTION

CAUTION!

Protect the wire bundle plug connected to the revolution counter against accidental disconnection.

4.3.3 Setting the wind number

- Press F1 i F2 simultaneously Previous settings are displayed The change enter mode is signalled by simultaneous lighting of the red LED – attention, and the green LED – wrapping
- Change the wrap number by pressing F2 choosing from the range 10-49
- Press C to confirm the change
- The counter is ready to work with a new setting.

4.3.4 Wrap-number calculating method

A formula for calculating the number of turntable revolutions N

$$N_T = L \times D \times k$$

$$N = [N_T]$$

N_T – the theoretical number of turntable revolutions

N – the target number of turntable revolutions

D – bale diameter [m]

L – film layers on a bale (2, 4, 6...)

k = 5.23 – elongation coefficient for the 750mm film

k = 7.85 – elongation coefficient for the 500mm film

To calculate the target number of turntable revolutions N, multiply your required number of film layers L by the bale diameter D and the elongation coefficient k which is suitable for the film width used for wrapping.

Then, round the result obtained up to the next whole number.

4.3.5 Selecting fields

- Press F1 to change the field number (1,2,3).
- Press F2 to change the indication of bales stored on a field to a screen with the number of wraps and bales.
- Use F2 to display data on the average output of the Bale Wrapper per work hour and wrapped bale number.
- Once the number of the field is selected, you can delete the counter indications by pressing simultaneously F2 and C. The red flashing LED and continuous sound signal that you can enter your changes.
- Hold the push buttons pressed until the sound goes off.
- The counter indications of a field have been deleted.

4.3.6 Counting-mode operation

- After the field is selected and the wrap number set, you can start work The counter moves to the wrapping-indication options automatically after it receives pulses from the revolution sensor of the Bale Wrapper
- After the pre-set number of wraps is reached, the counter display and the red LED flash alternately. The wrap is also signalled by an intermittent sound.
- Delete the signal of the wrapping end by pressing and holding C. Hold the push button until a number of wrapped bales is displayed and the red LED goes off
- The counter is ready to count the wraps of another bale.

Table 5. Sample indication of the L-02 counter display

Icon displayed	Indication	Sample indication	Meaning
	Bale counter	16	12 bales wrapped on a field
	Time	3.25	Work hours 3 hrs and 25 min. on a field
	Output	3.5	3.5 bales wrapped per 1 hour on a field on average
	Wrapping	24.15	Wrap counter is set to 24 Bale wrap is 15 at the moment
	Warnings Alerts	Err I lit flashing	Error no. 1

4.4 Working position

Before you start the operation, shift the Bale Wrapper from the transporting to the servicing position:

- Park the tractor with the Bale Wrapper on level and solid ground
- Release the mechanical lock of the drawbar position (Section 3.6.1)
- Set the Bale Wrapper drawbar to the service position using the wheel chock (Section 3.6.4) or the drawbar hydraulic cylinder, if present (Section 3.7)
- Engage the mechanical lock of the drawbar position (Section 3.6.2)
- Lift the loading arm to its maximum height and remove the transporting lock from the arm cylinder Put the lock in the holders on the right-hand side of the machine
- Lower the loading arm
- Remove the locking pins from the transporting securing device of the bale tipper unit
- Tilt the service table frame to lift the unit together with the service table and release the securing device of the tipper
- Remove the transporting protection of the tipper unit and place it in the holder on the tipper frame.
- Lower the service table with the tipper unit The frame of the tipper unit should lower to the horizontal position

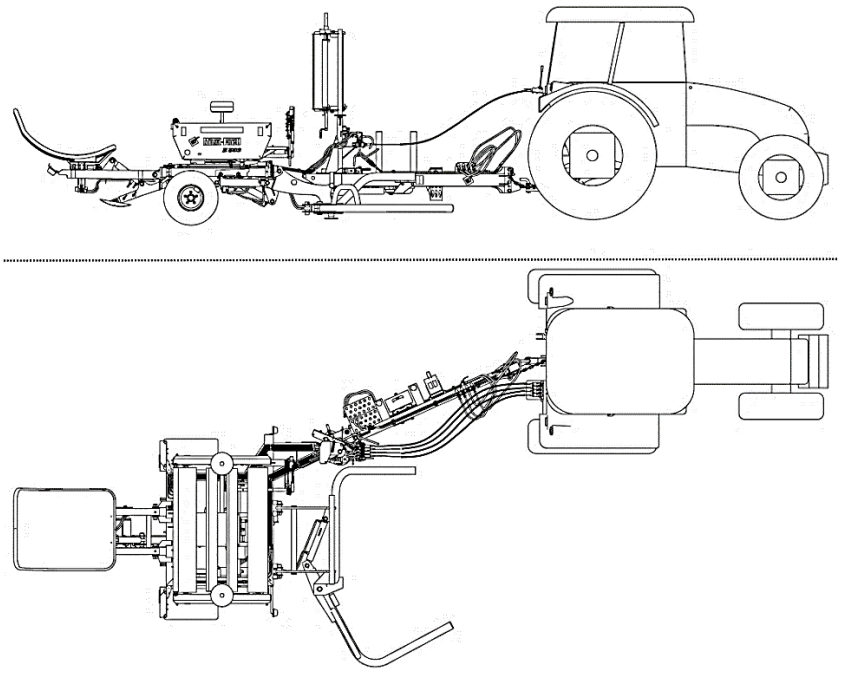

Figure 40. Servicing position of the Bale Wrapper

WARNING

WARNING!

Use caution when repositioning the drawbar. Risk of crushing hands.

4.5 Servicing cycles of the Bale Wrapper

When operating the Bale Wrapper, follow the successive work cycles.

- Loading – a bale is picked up from the ground with the loading arm to load and leave on the service table (Section 4.5.1)
- Wrapping – a bale is rotated on the service table and wrapped in successive film layers (Section 4.5.2)
- Unloading – a wrapped bale is carried from the service table onto the bale tipper grab, and then rolled to the ground (Section 4.5.3)
- Gripping and cutting the film – this automatic action is made at the initial phase of the unloading action and involves a film band, which is stretched between the bale and the film feeder, to be gripped and cut off at the bale side (Section 4.5.4)

Wrap bales in temperatures above zero. Perform the wrapping on a field or in the bale-storage area.

Avoid unnecessary the transporting to reduce the risk of damaging the film-covering bales.

CAUTION

CAUTION!

Before starting work, check

– the Bale Wrapper drawbar is connected to the tractor's hitch correctly
– correct connection of the power hydraulics
– correct connection of the revolution-counter system
– raising and lowering of the loading arm
– raising and lowering of the turntable frame
– revolutions of the rotary frame and rollers are unobstructed and in a correct direction – the rotary frame is to rotate counterclockwise when wrapping
– turntable lock
– the studs of the Bale Wrapper's ground wheels are tightened

WARNING

WARNING!

Before you turn on the rotary-frame drive, ensure there are no bystanders in the machine-operation area.

CAUTION

CAUTION!

Maintaining the proper condition of the rollers, particularly their edges, reduces the risk of film breaks during wrapping.

CAUTION

CAUTION!

Never wrap bales during precipitation.

CAUTION

CAUTION!

Stop wrapping when bales are wrapped too tightly. Find the cause of the high film tension.

Set the correct film tension. Resume bale wrapping.

4.5.1 Bale loading

Follow the procedure for bale loading (Fig. 41, 42).

- Drive the Bale Wrapper with its loading arm lowered and grabbing arm open towards a bale so that the loading arm on the drawbar side is as close to the flat wall of the bale as possible
- The centre line of the Bale Wrapper must remain perpendicular to that of the bale
- Stop the tractor when the bale leans on the retaining surface of the loading arm
- Raise the loading arm (2) until the bale rolls freely onto the turntable (3) – the grabbing arm should close first (1), and then the loading arm will be raised (2)
- Lower the loading arm (4) until the grabbing arm opens
- If you drive towards another bale when wrapping, lower the loading arm to its horizontal position

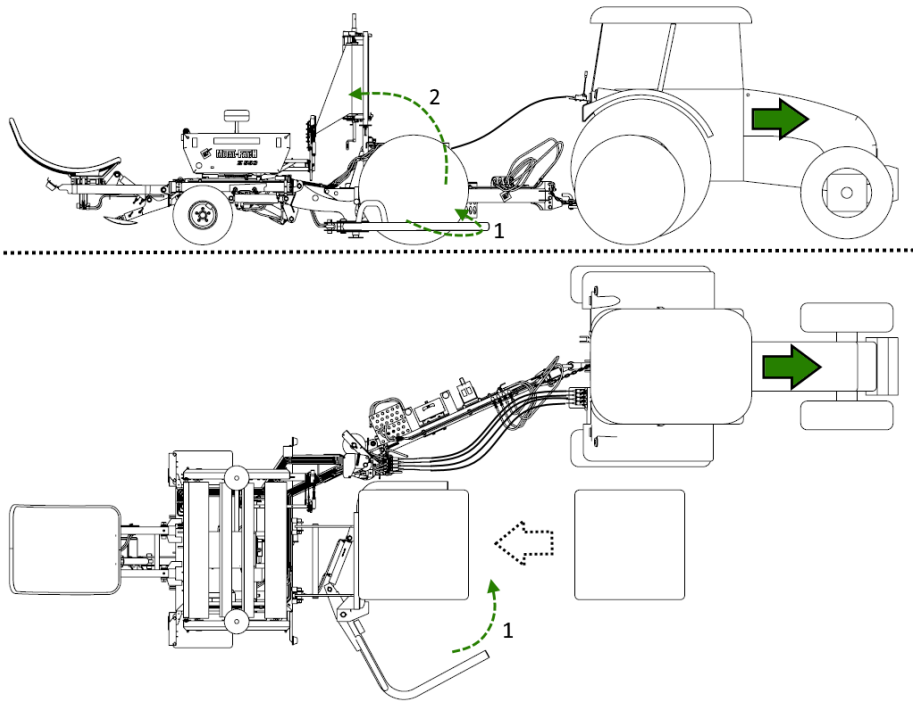

Figure 41. Bale-Wrapper position for bale loading

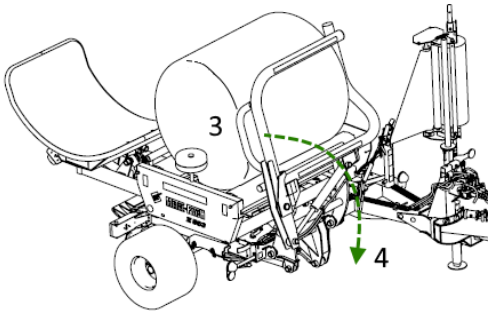

Figure 42. Bale loading

4.5.2 Wrapping

Follow the procedure for bale wrapping (Fig. 43, 44, 45)

- For the first bale, pull the film as far as possible away from the feeder and tie it to the bale with twine or a net for bale tying. For subsequent bales, the end of the film already rests in the cutter pick.
- Move the lever controlling turntable revolutions smoothly to switch on the drive of the Bale Wrapper's hydraulic motor in the wrapping direction (1) Make the two first revolutions with a lower speed than the wrapping speed
- With every revolution of the turntable, a bale which rests on it is simultaneously rotated around its horizontal centre line (2), which results in successive film layers' overlapping one another and the bale's being tightly wrapped
- The side wheels mounted on the sides of the rotary frame secure the bale against rolling from the rollers when being wrapped

- Wrap the bale maintaining the tractor-engine speed of 1,500 rpm Individual film layers should have a 50% overlap
- A continuous sound generated by the bale counter means the last revolution is being made – lower the service table's rotational speed smoothly
- Stop the service table at the position exceeding the initial position by ca 45° (3).
- Use the lever controlling table revolutions to steer in the opposite direction to the wrapping direction, which results in the position of the service table's being locked in the initial position (4)
- When locking, shortening the cylinder (5) will cause the locking pin to move out (6) towards the bushing on the service table
- A locked service table will not move back further than to its initial position
- Bales wrapped and counted can be confirmed on the counter – hold the C push button

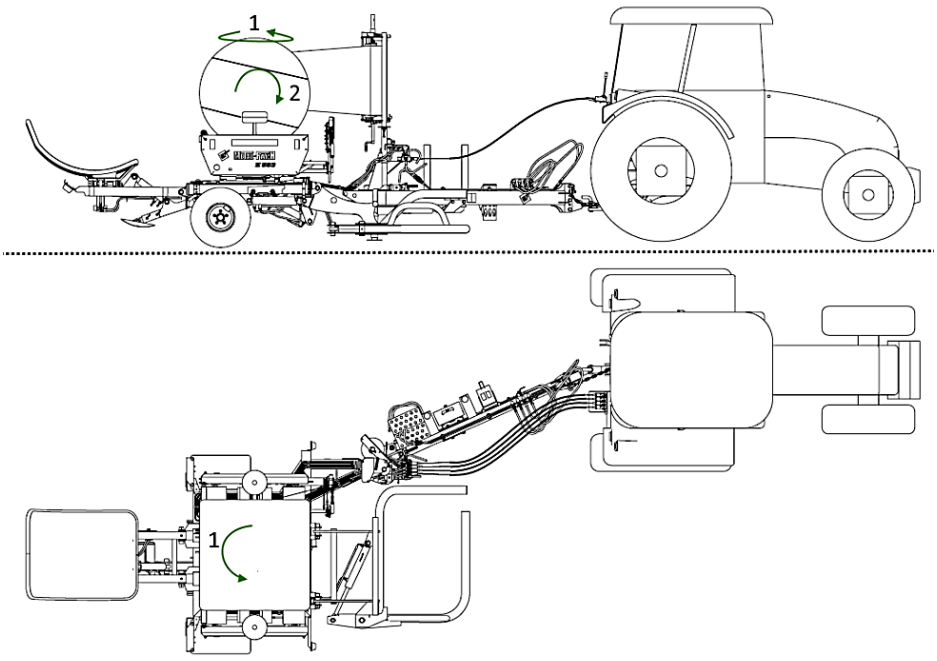

Figure 43. Wrapping bales

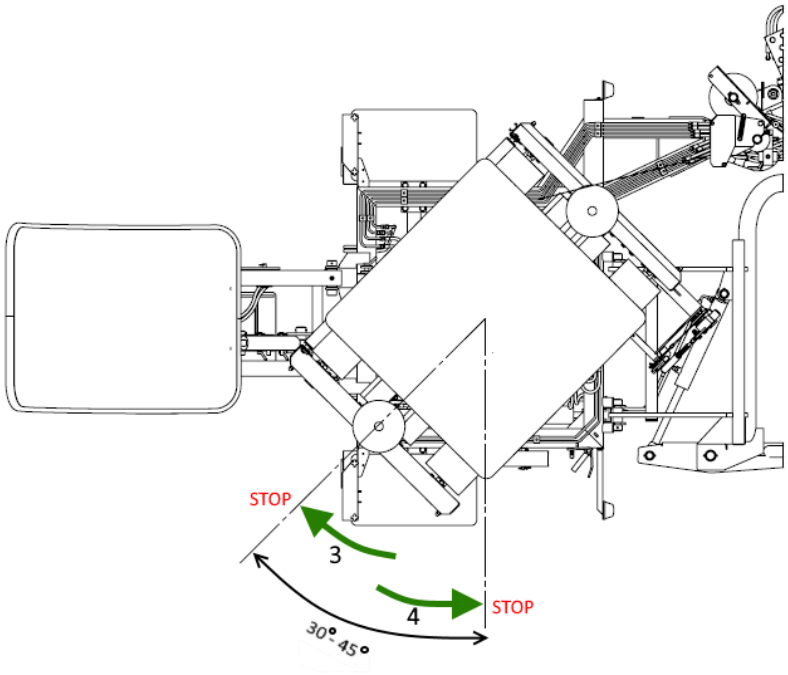

Figure 44. Stopping and locking the service table

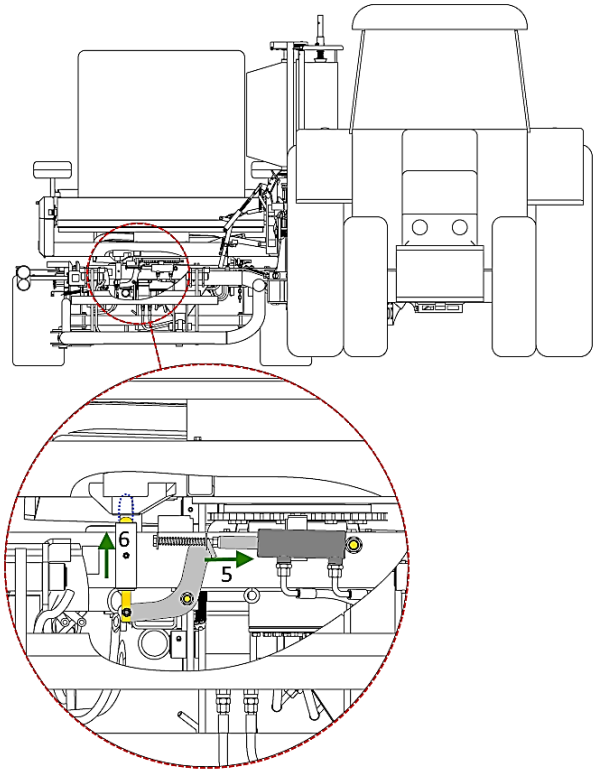

Figure 45. Service-table lock

4.5.3 Unloading the wrapped bale

Follow the procedure for bale unloading (Fig. 46, 47, 48, 49)

- Make sure the turntable is locked so it does not move accidentally
- Use the control lever to raise the service-table frame Firstly, the bale tipper unit should rise (1), and then the frame of the service table (2)
- At the extreme point of raising the film should be grabbed and cut off (3)
- Turn the control lever smoothly in the opposite direction to lower the tipper unit with a bale in the tipper grab (4)
- Keep lowering the tipper unit until it reaches its lowest position (5)
- Use the lever which controls the tilting of the tipper grab to tilt the bale (6) until it rolls from the grab and is placed on the ground resting on its flat wall (7)
- Set the tipper grab in its initial position (8)
- Lower the service table to the horizontal position (9) The bale tipper unit should also reach its horizontal position (10)
- Drive away from the unloaded bale and take care not to damage it when doing so
- Lower the loading arm fully until the pick arm opens fully – the Bale Wrapper is now in its initial position

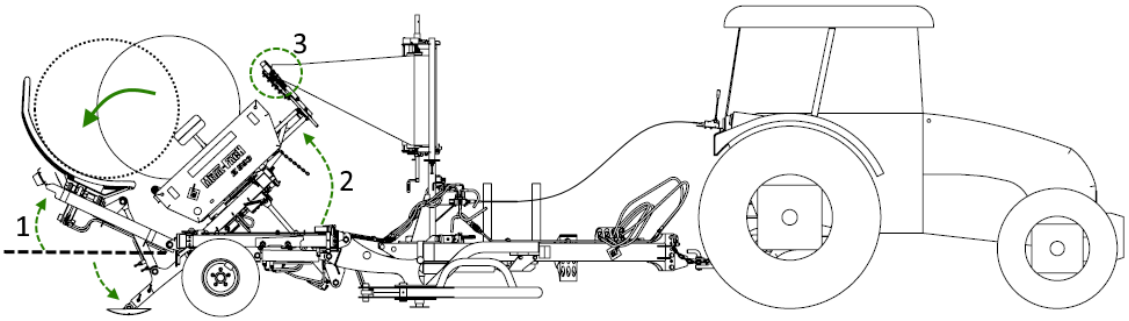

Figure 46. Raising the service table and the bale-tipper unit

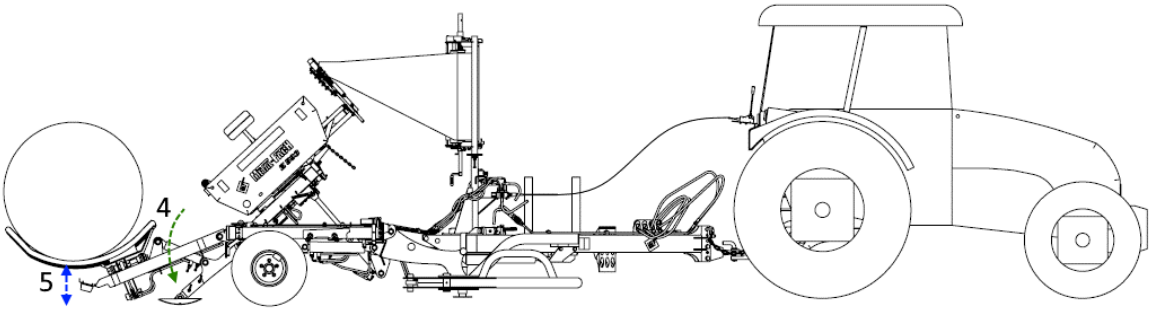

Figure 47. Lowering the tipper unit with a bale in the grab

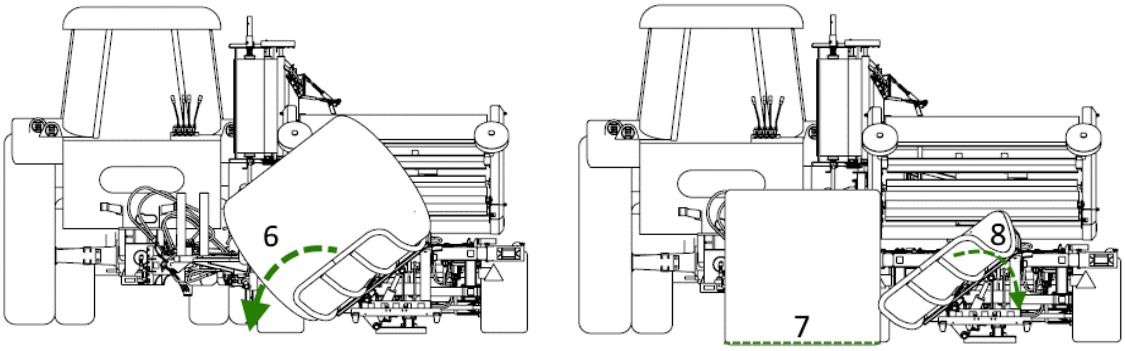

Figure 48. Tilting the tipper grab

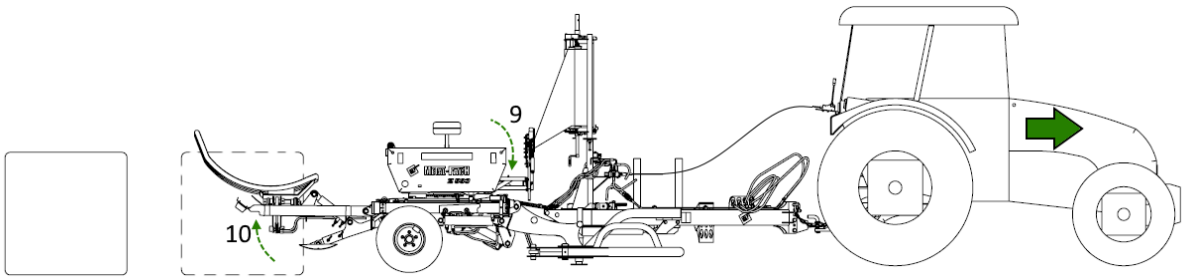

Figure 49. The service table and bale tipper being set to the servicing position

4.5.4 Film cutting

Follow the procedure below to grab and cut the film (Fig. 50)

- At the initial unloading phase, when the service table is raised, the film band, stretched between the bale and the feeder, lands between the clamping surfaces (1)
- When the service table reaches its highest position, the lever (2), pulled by the chain (3), makes the cutter axle swivel (4)
- The swivelling movement of the cutter axle is interlocked with the movement of the cutter arm (5)
- Firstly, the cutter-arm swivel, which has an articulated connection with the clamping device by means of a sprung rod (6), closes the clamp, and the film is grabbed
- Then, the cutting blade, which has an articulated connection link (7) with the cutter's arm, swivels and cuts off the film between the clamping device and a bale
- This coincides with the rope's pulling the arm buffer (8), which moves back to its initial position

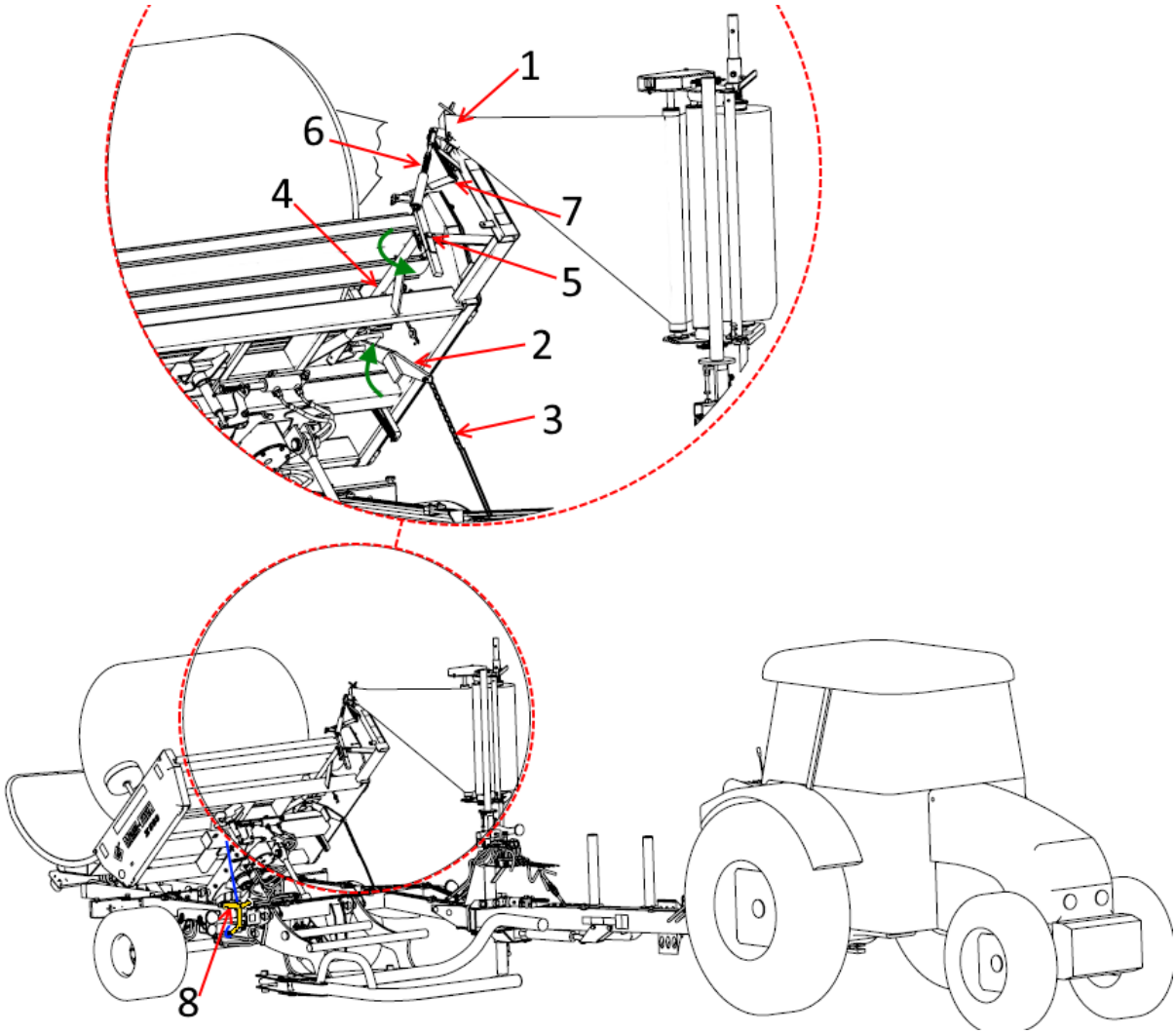

Figure 50. Grabbing and cutting the film

Releasing the film after the second revolution of the service table.

- Immediately before the end of the first revolution, the cutter arm hits the arm buffer to make it turn and set in the locked position
- At the end of the second revolution, the cutter arm hits the surface of the locked buffer, and this impact makes the arm swivel on its axle in the opposite direction to the one during the cutter closing action
- The swivel of the cutter arm results in the clamping device's and cutter blade's opening
- In the open position, the cutter arm moves over the buffer to a height which does not enable their contact during subsequent turns

CAUTION

CAUTION!

Raising the service table which is not locked risks damage to the cutter unit.

Always lock the service table before you start loading or unloading.

CAUTION

CAUTION!

The cutter must be closed when a bale is loading.

WARNING

WARNING!

In the event of hazard in terms of the Bale Wrapper operation lower the control levers of the hydraulic manifold. Stop the tractor engine, take the key from the ignition and engage the auxiliary brake of the tractor. Locate the hazard and rectify it.

4.6 Film breaking

Follow the procedure below when the film breaks during wrapping.

- Stop the service table rotary movements smoothly
- Set the lever of the tractor's hydraulic manifold to neutral, switch off the engine of the tractor, apply the auxiliary brake and take the key from the ignition
- Pull the film band from the film feeder and fix its end to a bale
- Start the tractor and its hydraulic system
- Start wrapping and make additional revolutions of the service table to cover the bale tightly, if needed

4.7 End of operation – Bale Wrapper the transporting position

After the work is finished, clean the machine of the hay, net and film remains. Disconnect the revolution counter and put it away in the tractor cab or in the box on the Bale Wrapper drawbar.

Set the Bale Wrapper in the transporting position.

- Park the tractor with the Bale Wrapper on level and solid ground
- Release the mechanical lock of the drawbar position (Section 3.6.1)
- Set the Bale Wrapper drawbar to the service position using the wheel chock (Section 3.6.3) or the drawbar hydraulic cylinder, if present (Section 3.7)
- Engage the mechanical lock of the drawbar position (Section 3.6.2)
- Set the bale tipper to the transporting position and secure it (Section 7.1.1)
- Lift the loading arm to its maximum height and fit the transporting lock on the cylinder arm (Section. 7.1.2)
- Lower the loading arm slowly until it rests on a lock
- Set the front lighting housings of the Bale Wrapper to a position for road transporting (Section 7.1.3)

CAUTION

CAUTION!

Disconnecting the Bale Wrapper from the tractor with a bale lying on the turntable is not allowed.

CAUTION

CAUTION!

Driving the Bale Wrapper on public roads with a bale loaded is not allowed.

5. Operation and maintenance activities

WARNING

WARNING!

The operation and maintenance activities can be performed exclusively by persons familiar with this Instructions Manual, having the relevant qualifications and tools for performing such activities. Lack of knowledge concerning the principles of safe operation and maintenance works of the Wrapper and the use of improper tools can result in hazard to human life or machine damage Wrapper

While performing operation-maintenance works you should wear appropriate protective clothes and boots, adequate for the activities to be performed and substances with which you will be in contact.

Do not repair leakages from the pressurised devices and hydraulic elements.

In the event of damaging machine parts they should be replaced with new, original parts. The use of non-original or incorrect parts results in the loss of the machine guarantee.

Unintended operation of the Wrapper or operation by unauthorised persons who do not have right qualifications must be strictly avoided.

Accidental starting up of the machine must be prevented.

In case it is necessary to carry on work on Wrapper elements which cannot be reached standing on the ground, only equipment intended for ascending (safe ladders) can be used. Do not use Wrapper elements for climbing the machine.

Tighten the bolts on fixed connections according to the values of the tightening torques shown in **Table 6** (**Section 5.4**).

Tighten the bolts on moving connections so that the lowest possible play is achieved and their mobility is preserved.

Follow the check lists during connecting the machine with the tractor, starting it up and disconnecting the Wrapper with the tractor.

It is recommended to run an operation and maintenance activities log book. This will allow a continuous insight into the machine's technical condition and to avoid repair activities in the field.

Hydraulic oil leakages to the environment must be prevented. Carry out repairs to the hydraulic installation in a place where there is no danger of oil penetration into the soil, ground water, food, or animal fodder. Use tight and safe containers to store used oil.

If it is necessary to conduct operation-maintenance activities under elevated machine parts (e.g. wheel replacement), they must be protected against lowering by installing stable supports underneath. .

When changing a wheel, lift the Bale Wrapper using the points marked with the jack pictogram  .

CAUTION

CAUTION!

Do not inflate the tyres over the recommended pressures. For unladen machine this is 1.7 bar.

5.1 Cleaning

Take great care with the use of pressure devices during the cleaning procedure. The bearings and the bolt, hydraulic, and electrical, connections are not water-resistant. Do not expose these components to water for a longer time. Each time after you clean the machine with water, these components must be lubricated again. Dry the places where the electrical bundle sheath is damaged and protect them with water-resistant repair tape for electrical bundles.

Cleaning the machine after use

- Clean the machine of all vegetation, their residues, and other dirt.
- Clean the lighting components.
- Clean the warning pictograms and the rating plate to keep them legible.
- Wipe the fil- adjuster rollers to remove dirt; denatured alcohol can be used for this.
- The service-table rollers can be washed with water with detergent and a pressure device.

Protecting the machine after cleaning

- After you have cleaned the machine with water, lubricate bearings, gaskets, and articulated connections again.
- Apply a layer of a plant-origin oil on the film-cutter blades.
- Protect any coating defects and protective layer scratches with anti-corrosion agents and paint.
- Damaged safety stickers must be renovated or added as required.

Clean the soiled L-02 counter casing with a dump piece of cloth with some detergent. Do not use organic solvents for washing (e.g. acetone, benzine, nitro solvent), as it can result in damage to the panel casing..

The rating plate to be replaced in the service only.

Take the counter to the authorised service centre if it is damaged. Repairing the counter yourself voids the guarantee.

5.2 Machine maintenance

To maintain the proper working order and service life of the moving components of the machine, follow the guidelines laid down in the maintenance table (**Tab. 7**) and carry out regular inspections of the machine. The maintenance work is to be carried out on the Wrapper set in the working position. If any other position needs to be used, it will be noted accordingly.

Use the greases class EP 2 or EP 3 (e.g. ŁT-43 EP-3) as plastic grease. Use a grease gun to apply lubrication via the grease nipples. Use a brush covered with grease to lubricate sliding surfaces. As for the roller chains, it is recommended to use greases and oils dedicated for roller chains.

Removing from the sliding surfaces as much of the residue of the previous grease as possible before carrying out the lubrication is recommended, as it can contain contaminations (sand, organic impurities) which cancan cause quicker part degradation or loss of grease properties. After carrying out the lubrication, remove the excess of grease spilt from the lubrication points so that you prevent them from attracting dirt and hampering the machine's operation.

5.3 Scheduled Inspections

Periodic routine inspections are recommended to be performed after each two seasons of machine use. For replacements it is recommended to use original spare parts which will ensure maintaining the Wrapper in full efficiency for a long period of its operation.

Replace the power hydraulics rubber hoses every 5 years.

Follow the procedure below to change the oil in the angle gearbox of the machine every two years.

- Position the machine on level ground
- Place a suitable, watertight, container under the drain plug
- Unscrew the inlet, drain, and overflow plugs
- Once the oil has been drained, replace and tighten the drain plug
- Pour the 80W90 transmission oil through the inlet hole up to the overflow-cap level
- Tighten the overflow and inlet plugs
- Supply the used oil to a petrol station that deals in its purchase.

CAUTION

CAUTION!

During the operation of the oil exchange use impermeable protective clothes adapted for contact with crude-oil-derived products.

5.4 Metrical-bolt tightening torques

Optimised tightening-torque values for bolts or screws and nuts [Nm] are shown in Tab. 6.

Table 6. Tightening-torque values for metric bolts

Bolt-tightening torques – metrical bolts in Nm							
Size ∅ mm	**Pitch mm**	**Bolt version – strength classes**					**Wheel nuts, wheel screws**
		4.8	**5.8**	**8.8**	**10.9**	**12.9**	
3	0.50	0.9	1.1	1.8	2.6	3.0	
4	0.70	1.6	2.0	3.1	4.5	5.3	
5	0.80	3.2	4.0	6.1	8.9	10.4	
6	1.00	5.5	6.8	10.4	15.3	17.9	
7	1.00	9.3	11.5	17.2	25	30	
8	1.25	13.6	16.8	25	37	44	
8	1.00	14.5	18	27	40	47	
10	1.50	26.6	33	50	73	86	45
10	1.25	28	35	53	78	91	
12	1.75	46	56	86	127	148	
12	1.50						80
12	1.25	50	62	95	139	163	
14	2.00	73	90	137	201	235	
14	1.50	79	96	150	220	257	140
16	2.00	113	141	214	314	369	
16	1.50	121	150	229	336	393	220
18	2.50	157	194	306	435	509	
18	1.50	178	220	345	491	575	300
20	2.50	222	275	432	615	719	
20	1.50	248	307	482	687	804	400
22	2.50	305	376	502	843	987	
22	2.00						450
22	1.50	337	416	654	932	1090	500
24	3.00	383	474	744	1080	1240	
24	2.00	420	519	814	1160	1360	
24	1.50						550
27	3.00	568	703	100	1570	1840	
27	2.00	615	760	1200	1700	1990	
30	3.50	772	995	1500	2130	2500	
30	2.00	850	1060	1670	2370	2380	

5.5 Lubrication interval

Table 7. Lubrication-interval table

COMPONENT NAME	LUBRICATION POINT	FIGURE NO.	LUBRICATION INTERVAL				NOTES
			Every 10 working hours	Every 50 working hours	Pre-seasonally	Post-seasonally	
Turntable bearings	5	52			•		Grease gun – bearing lubricant
Service-table roller bearings	5	51		•	•	•	Bearing lubricant or lube oil
Film feeder bearings	5	51		•	•	•	Bearing lubricant or lube oil
Drawbar safety bolt	1	51			•		Grease gun – bearing lubricant
Articulation pins of moving parts	2	51, 52		•	•	•	Grease gun – bearing lubricant
Chain drive – service table, roller drive, film tensioner gear unit	3	51, 52	•		•	•	Oils or grease dedicated for roller chains
Film-roll clamping-device thread	7	51		•		•	Bearing lubricant or lube oil
Support-foot device thread	7	52			•	•	Grease gun – bearing lubricant
Cylinder bushes	6	51, 52		•	•		Grease gun – bearing lubricant
Film-cutter device – revolution axle	8	51		•	•		Grease gun – bearing lubricant
Film-cutter device – moving articulation	8	52	•		•		Bearing lubricant or lube oil
Film-cutter device – cutting blades	8	52				•	Plant-based oil
Axle gear box	4	51	Refill gearbox oil every 2 years				80W90 gear oil

5.6 Lubrication points

List of parts to be lubricated (Fig. 51, 52)

1 – Drawbar safety pin

2 – Pin

3 – Chain drive

4 – Axle gear box

5 – Rolling bearing

6 – Cylinder bushes

7 – Thread

8 – Film cutter unit

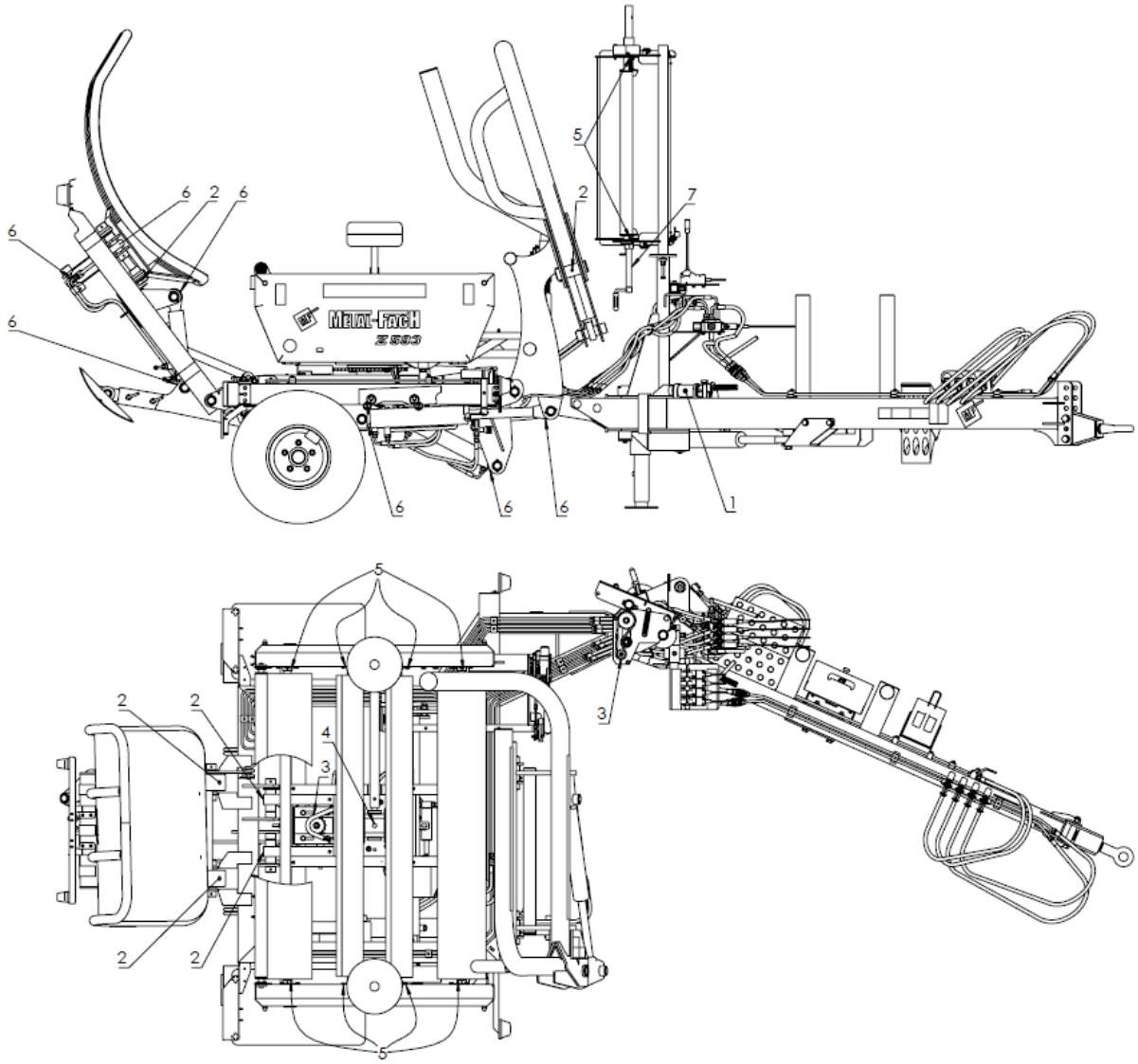

Figure 51. Lubrication points – top right-hand side view

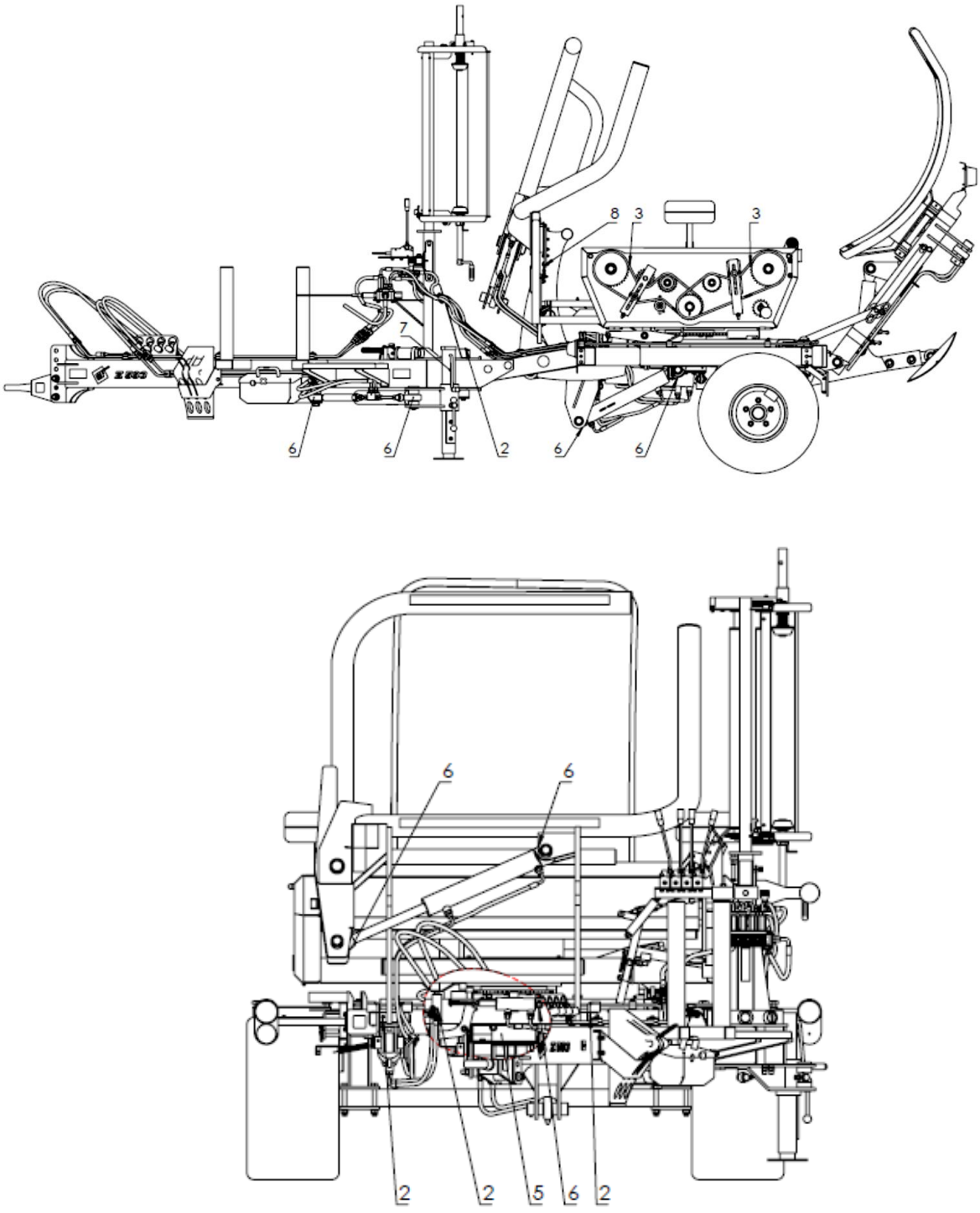

Figure 52. Lubrication points – front left-hand side view

6. Authorised service

6.1 Guarantee service

The manufacturer provides a guarantee for the machine on the terms and conditions stipulated in the Guarantee Certificate. In the period covered with the guarantee the repairs are performed by the authorised services of the dealers or the manufacturer's services.

6.2 Routine service

After the period of the guarantee coverage it is recommended to have carried out periodic inspections at the authorised services of the dealers.

6.3 Ordering spare parts

Purchase the spare parts at the dealer centres, or order them from the manufacturer directly, providing first and last name, or the company name and the address of the buyer, name, logo, factory number and year of manufacture, catalogue-part name, catalogue drawing or standard number, number of ordered parts, and agreed terms of payment..

7. Wrapper transporting

7.1 Road-Traffic Participant

The Bale Wrapper is designed for public-road traffic as a machine attached to the farm tractor's hitch.

The dimensions of a machine properly prepared for transporting – Section 1.6.

Only agricultural tractors with a power output not lower than 30 kW and a drawbar-pull class not lower than 0.9, fitted with the farm hitch, can be used for transporting on public roads. The tractor with the Bale Wrapper coupled with it must meet the stability requirements – Section 7.2.

Prior to entering the public roads prepare the Bale Wrapper properly.

- Lock the rotary frame of the machine (Section 4.5.2, Fig. 44, 45).
- Secure the bale-tipper unit to the transporting position (Section 7.1.1)
- Lift the loading arm and fit its transporting lock (Section. 7.1.2)
- Set the drawbar to the transporting position and secure it (Section 3.6)
- Open the rear road-light housings and lock their positions using the knobs (Section 7.1.3)
- Disconnect and protect the hydraulic hoses properly (Section 2.3.2, Fig. 10 – 8).
- The control levers can be left in the cab or fixed to the holder over the hydraulic manifold.
- Remove the film roll from the feeder and place it in the storage bin on the Bale Wrapper's drawbar
- If required by the local regulations, connect the machine's lighting plug and use a bracket to fit the Bale Wrapper with a board for slow-moving vehicles

CAUTION

CAUTION!

Prior to each departure of the Bale Wrapper onto public roads, check the correctness of the machine's connection with the tractor.

CAUTION

CAUTION!

Before you drive on public roads, remove the film roll from the feeder and put it inside the storage bin on the Bale Wrapper's drawbar.

CAUTION

CAUTION!

It is forbidden to carry people or silage bales on the turntable or other components of the Bale Wrapper.

CAUTION

CAUTION!

When transporting the machine on public roads, adjust the speed to the traffic conditions and do not exceed the speed limit given on the Bale Wrapper's tyres (**Tab. 2 Section 1.5**).

When transporting the Bale Wrapper on public roads follow the Traffic-Law regulations.

If stopping the tractor with an attached Bale Wrapper in an emergency on a public road, the driver must

- stop the vehicle without endangering road safety,
- park the vehicle parallel to the road-centre line, as close to the edge as possible,
- switch off the engine and remove the key from the ignition, engage the auxiliary brake, and place chocks under the wheels of the Bale Wrapper
- switch on the hazard lights and place a warning triangle between 30 and 50 metres behind the vehicle outside a built-up area
- outside a built-up area, switch on the hazard lights and place a warning reflective triangle behind the vehicle, unless it is installed in a bracket at the rear of the machine, but always ensure that other road users can see it clearly
- in the event of a breakdown, take the appropriate steps to ensure safety for yourself and other road users.

7.1.1 The Bale-tipper‘s transporting position

Follow the procedure below to set the bale tipper to the transporting position (Figs. 53,54)

- Set the support foot of the bale tipper in the position of two D holes – maximum extension (Section 3.8)
- Set the service table in the locked position
- Use the control lever to raise both the service-table and bale-tipper unit frames (1)
- Switch off the engine of the tractor, apply the auxiliary brake, and take the key from the ignition
- Remove the transporting lock of the bale tipper (2) from its holders, and mount it at the locking points on both the main frame (3) and the tipper frame (4)
- Use the locking pins to secure the position (5)
- Start the tractor and use the control lever to lower the service-table frame (6)
- Hold the lever which lowers the service table for ca 2 s to let the support foot of the bale-tipper’s unit rise (7)
- Set the support foot in the position of two A holes – minimum extension (Section 3.8)

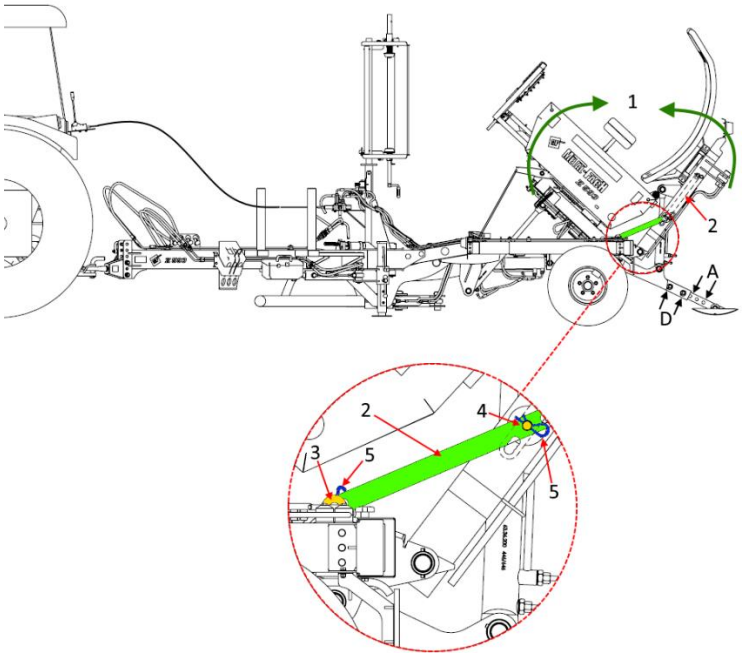

Figure 53. Locking the bale tipper in the transporting position

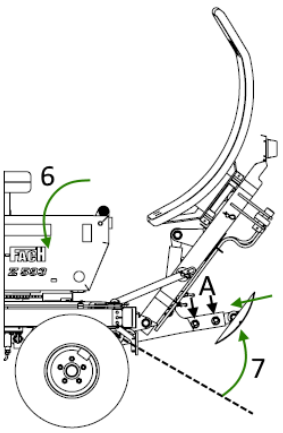

Figure 54. Setting the transporting position of the bale tipper's support foot

7.1.2 Securing the loading arm

Follow the procedure below to secure the loading arm in the transporting position (Fig.55).

- Ensure the turntable is set to its locked position
- Use the control lever to lift the loading arm to its maximum height (1)
- Switch off the engine of the tractor, apply the auxiliary brake, and take the key from the ignition
- Remove the transporting lock of the cylinder (2) from its holders (3) on the Bale Wrapper frame
- Fit the transporting lock on the cylinder (4), secure its position with cotter and locking pins (5)
- Start the tractor and switch on the hydraulic system, lower the loading arm slowly (6) until the arm cylinder leans on the lock

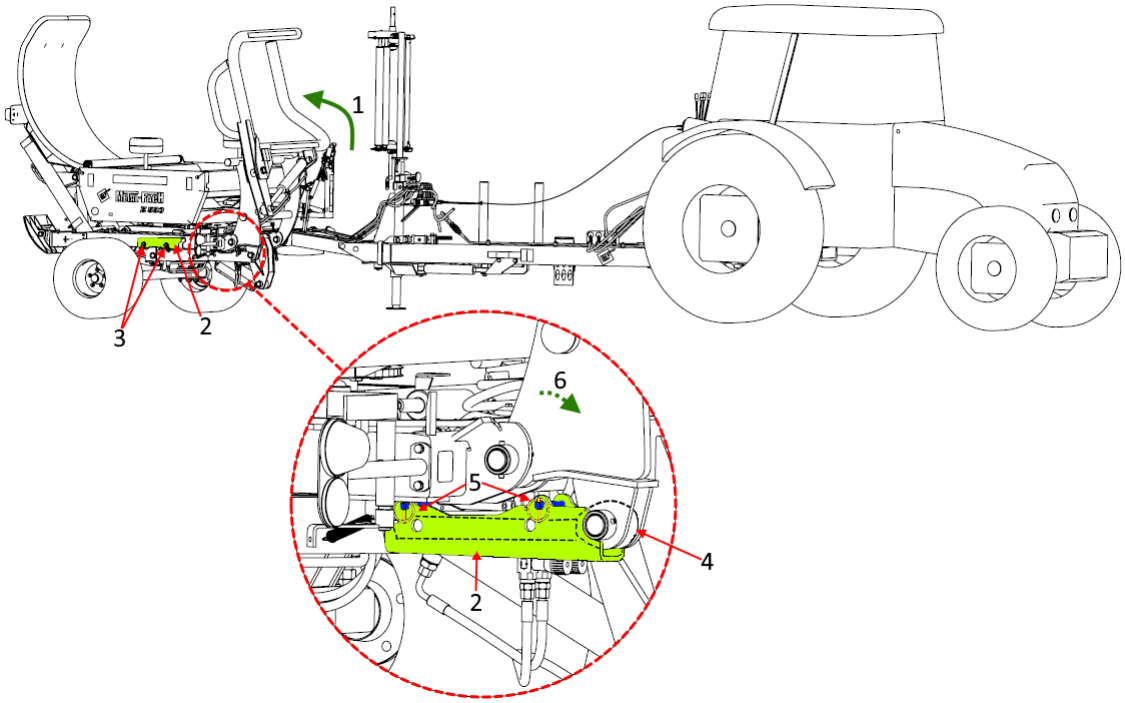

Figure 55. The loading arm's transporting lock

7.1.3 Removing the housings from the rear lights

Follow the procedure below to set the lighting in the transporting position (Fig. 56).

- Loosen the knobs (1) which retain the light housings (2)
- Open the housings to move them to the transporting position (3)
- Tighten the retaining knobs to secure the housing in the transporting position (4)

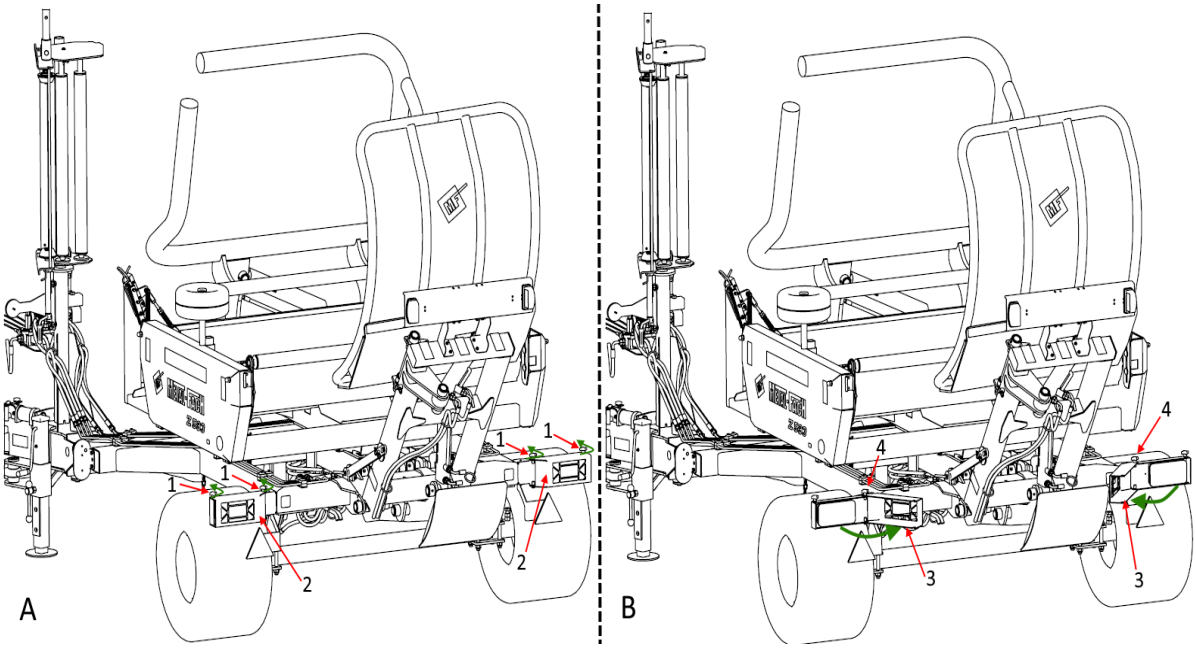

Figure 56. Lighting housings,
A – service position, B – the transporting position

7.2 The Tractor's and Bale-Wrappers stability

Before coupling the tractor with the Wrapper, make sure that the traffic is fully manoeuvrable. The front-axle load of the tractor must be at least 20% of the tractor's weight (Fig. 57). If this condition is not fulfilled the front axle of the tractor must be loaded additionally.

Never couple the Bale Wrapper with a tractor which fails to meet the stability requirement.

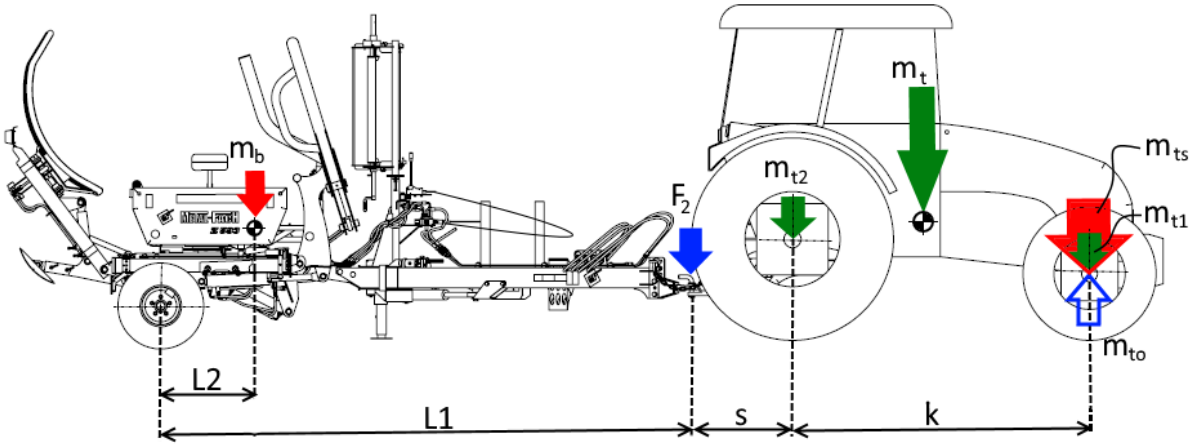

Figure 57. Tractor and Bale Wrapper manoeuvrability

Calculating the manoeuvrability of the Tractor and Bale Wrapper (Fig. 57).

$$F_2 = \frac{m_b \times g \times L_2}{L_1} \Rightarrow |F_2| \approx 2500\ N$$

$$m_{to} = \frac{F_2 \times (k + s)}{k \times g}$$

$$m_{ts} = m_{ts} - m_{to}$$

$$m_{ts} \geq 0{,}2 \times m_t$$

where

F_2 – downward vertical force acting on the hitch [N]

m_b – maximum Bale-Wrapper weight [kg]

m_t – tractor weight [kg]

m_{t1} – the front-axle load of the tractor, without the Bale Wrapper's being hitched [kg]

m_{to} – the additional unloading of the tractor's front axle after coupling the Bale Wrapper [kg]

m_{ts} – the front-axle load of the tractor with the Bale Wrapper hitched [kg]

g – gravitational acceleration, g=9.8 [m/s^2]

L_1 – the distance from the hitch point to the Bale Wrapper's wheel-centre line, L_1=4.1[m]

L_2 – a distance from the Bale Wrapper's weight centre to its wheel-centre line, L_2=0.57[m]

k – the distance between the tractor's axles [m]

s – the distance between the centre of the rear axle of the tractor to the hitch point [m]

7.3 Load transporting

The Wrapper is adapted for the rail and road transporting of the appropriate capacity.

When loading, ensure the Bale Wrapper is in its transporting position and all the moving parts have their locks enabled.

CAUTION	CAUTION! For loading onto road vehicles, use lifting equipment with a lifting capacity appropriate for the Bale Wrapper's weight, including with a film roll loaded. As lifting points, use the parts of the frame marked on the machine with a pictogram .

The suspension-sling attachment points are shown in Fig. 58 .

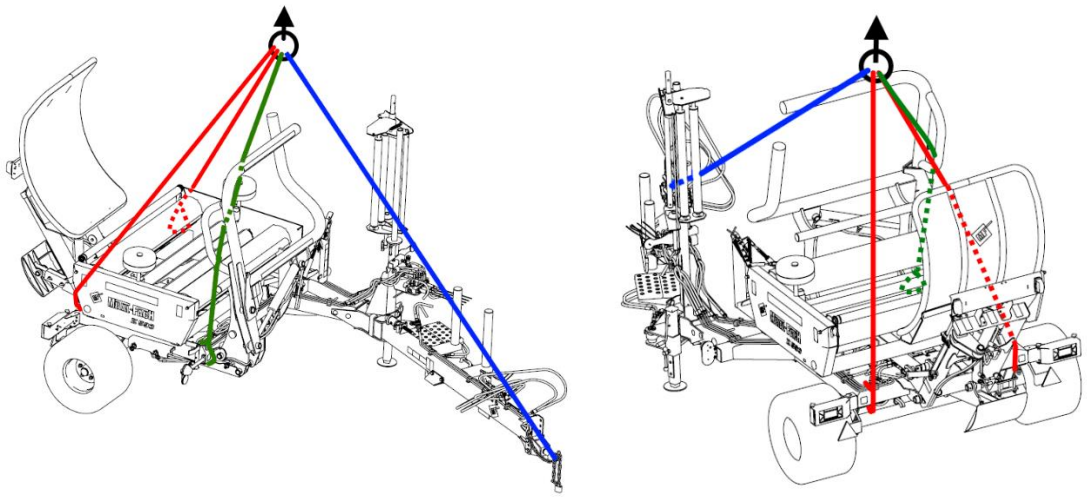

Figure 58. The suspension-sling attachment points on the Bale Wrapper

Lifting equipment can be operated by trained operators holding the relevant qualifications. It is forbidden to transport the Bale Wrapper with a bale located on it. During the time of the transporting the transported Wrapper should be permanently and reliably attached to the floor.

8. Wrapper storage

Post-seasonally, or after a longer period of the Bale Wrapper's non-use, perform the following tasks.

- Remove the film rolls from the feeder
- Clean the machine (Section 5.1)
- Carry out the recommended maintenance work (Section 5.2)
- Repair or replace parts if damaged
- Set the machine on a level, compacted, surface and place chocks under the Wrapper's wheels to prevent the Wrapper from rolling away
- It is recommended to store the Bale Wrapper under roofing or a protective waterproof tarpaulin
- Storing the Bale Wrapper in its transporting position with the loading arm secured against dropping is recommended
- Store the Bale Wrapper in a manner which does not compromise the safety of persons or animals The film cutter fitted with sharp blades must remain in the closed position
- Ensure the good condition and legibility of the rating plate If damaged, contact the service centre
- Store the wrap counter in a dry room protecting the terminals against dirt and humidity
- Secure the machine against unauthorised use (Fig. 10 – 1).

CAUTION

CAUTION!

Store the Wrapper in the atmosphere free from aggressive factors (e.g. ammonia, chemicals).

9. Residual Risk

9.1 Residual-risk descriptions

Residual risk results from erroneous behaviour by the Bale-Wrapper operator. The following prohibited actions cause the highest level of risk.

- Assembly of the Bale Wrappers on tractors which do not fulfil the requirements described in the Instructions Manual
- Standing under raised machine units
- Persons standing in the area of Bale Wrapper operation
- Servicing or repairing the Bale Wrapper when the tractor engine is still on
- Using faulty hydraulic lines
- Control of the Bale Wrapper by an operator who is outside the tractor cab
- Operating the Bale Wrapper under the influence of alcohol
- Operating a damaged Bale Wrapper or operation with the guards removed
- Operating the Bale Wrapper on slopes exceeding 8°
- The transporting of silage bales on the Bale Wrapper
- Persons standing on the machine during its operation or transporting
- Failing to use the Bale Wrapper for its intended purpose
- Leaving the unsecured Bale Wrapper on slopes
- Entering the area between the tractor and the machine when the engine is running

The presentation of residual risk it is assumed that the Bale Wrapper is a machine which until the moment of starting up had been designed and made according to the current state of the art.

9.2 The Assessment of Residual Risk

By observing the recommendations such as

- reading the guidelines of the Instructions Manual carefully and adhering to them
- standing under raised machine units is forbidden,
- no persons allowed in the area of Bale Wrapper operation
- maintenance and repair of the Bale Wrapper at authorised service centres
- operation of the machine by trained and authorised operators
- protect the Bale Wrapper against the access of children and third persons

It is possible to eliminate residual risk associated with the Bale Wrapper's operation, and thus the machine cancan be operated without any risk to humans and the environment.

WARNING

WARNING!

Failure to comply with the instructions and guidance of the Manufacturer can result in residual risks.

10. Wrapper disposal

Disassembly and disposal should be performed by specialised services familiar with the construction and operation of the Wrapper. Only specialised service centres have the full and up-to-date knowledge on the applied materials and he risks associated with the hazards of improper storage and the transporting. The authorised services provide both counselling and performance of the complete services concerning he disposal of the machine.

The correct tools and auxiliary equipment (hoist, lifting jack, wheel puller) must be used for disassembly.

CAUTION

CAUTION!

Store the used oil in airtight containers. Take it to a petrol station which accepts used oil immediately.

CAUTION

CAUTION!

Disassemble the machine. Sort the disassembled parts. Supply the dismantled parts to the relevant recycling points.

During the disassembly of the Wrapper wear the proper protective clothes and protective boots.

11. Typical faults and troubleshooting

The majority of errors and faults can be rectified by the users on their own. Before contacting the service centre or manufacturer, the users should check that it is possible to identify and solve the problem by themselves, using the information provided in this Section.

After an error or fault occurs, switch the Wrapper and tractor off and protect them from accidentally rolling away. It is prohibited to operate a damaged machine, as it can lead to damage to the machine and serious injuries.

Table 8. Typical defects which can occur during the use of the Bale Wrapper

No.	Fault description	Cause	Method of rectification
1.	Hydraulic oil gets overheated quickly	Insufficient amount of oil in the tractor system	Ensure the correct oil level in the tractor Replenish the oil
		Volume consumption on the tractor valve set incorrectly	Reduce the oil consumption volume in the tractor
		Supply pressure too high	Set a lower supply pressure
		Power hydraulic plugs connected incorrectly	Check the correct connection and condition of the hydraulic plugs
2.	Hydraulic cylinders move too slowly	Insufficient amount of oil in the tractor system	Check the oil level in the tractor and refill if necessary.
		Volume consumption on the tractor valve set incorrectly	Reduce the oil consumption volume in the tractor
		Faulty setting of the cylinder throttling valves	Check the setting of the throttling valves (Section 3.12)
		Power hydraulic plugs connected incorrectly	Check the correct connection and condition of the hydraulic plugs
3.	The hydraulic motor and cylinders work too fast and too hard	Too-high pressure in the hydraulic system	Set a lower supply pressure in the tractor
		Too-high volume of oil consumption from the tractor	Reduce the oil consumption volume in the tractor
		Incorrect manner of Bale Wrapper control	Follow the recommended method of lever control
4.	One of the cylinders does not move	The system supplying the engine not tight	Check for possible external leakage
		Damaged cylinder	Contact the dealer
		The rod of the control wire damaged	Contact the dealer
No.	Fault description	Cause	Method of rectification
5.	The loading arm cannot lift a bale	Bale weight too high	Try to wrap bales with a weight which meets the use requirements

		The hydraulic system pressure too low	Raise the pressure of the hydraulic supply for max. 160 bar
6.	The grabbing arm opens during the lowering of the loading arm before it has been lowered	The articulated joint pins on the loading arm are stuck	Remember that it is necessary to carry out servicing and maintenance works
7.	The service table tends to rotate when loading	The service table not locked after being stopped	Remember to lock the table before it moves to the unloading position
		The throttle/ non-return valve at the hydraulic manifold not adjusted	Adjust the throttle/non-return valve on the hydraulic manifold (Section 3.13.1)
8.	Incorrect procedure during unloading	The throttle/non-return valves of the tilting frame cylinder set incorrectly	Adjust the throttle/non-return valves at the tilting frame cylinder (Section 3.12.2)
9.	The bale tipper drops too fast and bales roll out of the tipper cradle when the tipper is lowered	The throttle/non-return valve at the bale tipper cylinder set incorrectly	Adjust the throttle/non-return valve on the tilting frame cylinder (Section 3.12.2)
		Bales are too heavy or deformed	Try to wrap bales with weights which meet the use requirements
			Exercise caution when wrapping bales of a low compaction degree
			Customise the throttling value of the throttle/non-return valve for the bale weight
10.	Film is not grabbed	The film-clamping mechanism set incorrectly	Set the film-clamping mechanism (Section 3.13)
		The fil- feeder setting incorrect	Set the height and angle of the film feeder
11.	Film is not cut	The film-cutting mechanism set incorrectly	Set the film-cutting mechanism (Section 3.13)
		The blade fixed loosely; worn blade	Fix the blade properly; replace the blades
12.	Problems with bale loading, wrapping and unloading	Unsuitable shape or/and dimensions of the bale	Wrap bales in the correct shape and dimensions given in the Bale-Wrapper characteristics
No.	Fault description	Cause	Method of rectification
13.	The film on a wrapped bale is damaged during unloading	Incorrect place of unloading	Unload the wrapped bales only at a place which does not pose a risk of damaging the bale

		Bale drop height incorrect	Adjust the extension of the tipper support foot to set the drop height
		Incorrect procedure during unloading	Prior to unloading, stop the tractor, and prior to driving away from a bale, fold the tipper cradle
14.	Improper film coverage of a bale	Too few layers	Set a correct, efficient, number of turntable revolutions for bale wrapping
		Incorrect ratio of turntable-roller revolutions to turntable revolutions	Check that the correct double sprocket is fitted for the film width (Section 3.11.1)
		The fil- feeder setting incorrect	Set the correct height of the film feeder, release the frame hook in which the film roll is mounted
15.	Damage and breakage of the film band during wrapping	Damaged surface of the adjuster roller	Rub the roller surface with sandpaper
			Replace heavily damaged tensioner rollers with new ones
		Contaminated surface of the adjuster roller	Clean the roller surface
		Damaged film roll	Use better quality film which meets the elongation requirement to replace the film roll
			Exercise caution when mounting a roll on the feeder
		Tension of the drive chain of the film tensioner too high	Reduce the tension of the drive chain of the film tensioner
16.	The bale counter does not count revolutions	The distance between the sensor and activating magnet incorrect	Set the correct distance between the sensor and activating magnet
		Sensor wire or plug connecting the sensor with the counter damaged	Check the condition of the sensor wire and plug, contact the distributor
No.	Fault description	Cause	Method of rectification
17.	The distance for fitting the transporting lock between the bale tipper frame and the main frame not sufficient	The support foot of the tipper moved to the end of the adjustment range	Extend the support foot of the tipper to its maximum length for the time of fitting the transporting lock of the bale tipper

		Uneven ground	Fit the lock on a level ground
		Adjusting the throttle/non-return valve for the lowering unit of the bale tipper	Turn off the throttle/non-return valve of the bale tipper lowering unit for the time of fitting the transporting lock of the bale tipper Remember to reset the valve after you lock the tipper
18.	Occasional hindrance when unlocking the retaining pin which secures the drawbar in place	The retaining pin transmits part of the loads generated by the drawbar-frame articulated joint in the Bale Wrapper	Use the support foot of the Bale Wrapper to reduce the load on the retaining pin of the drawbar position Once the retaining pin is unlocked, fold the support foot

12. Accessories

The user can purchase the following optional and additional equipment additionally at the dealer or at the manufacturer:

- Drawbar hydraulic shifting set (Section 3.7)
- Spare-parts catalogue – hard copy
- Triangular plate indicating slow-moving vehicles
- Extractor for sprockets of the roller-drive chains
- Varnish-coating repair set

INDEX OF NAMES AND ABBREVIATIONS

A – Ampere, electric-current unit

Bar – bar, pressure unit (1 bar = 0.1 MPa)

OS&H – occupational health and safety

dB (A) – decibel A, sound-pressure unit

Drawbar pull class – a value characteristic for the drawbar pull of a tractor; class 0.9 corresponds to a drawbar pull of 9 Kn. The Ursus C 355 and 4011 tractors have this pull class.

kg – kilogram, weight unit

km/h – kilometre per hour, linear-speed unit

kW – kilowatt, power unit

m – meter, length unit

mm – millimetre, an auxiliary length unit equal to 0.001m

min – minute, an additional time unit corresponding to 60 seconds

rev. – revolution, a type of movement

rpm – revolutions per minute, rotation speed unit

Pictogram – a notice plate

Fig. X – a figure with a number “X”

Fig. X, Y – figures with numbers “X” and “Y”

Fig. X-Y – a figure with a number “X”, item in the figure “Y”

tab. Tab. X – a table with a number “X”

Rating plate – a manufacturer’s plate unambiguously identifying the machine

UV – ultraviolet radiation, invisible electromagnetic, invisible electromagnetic radiation with negative effects on human health; UV radiation has a negative effect on rubber parts

V – Volt, a voltage unit

Hitch, upper the transporting hitch – hitch components of a farm tractor (see a tractor’s instructions manual)

ALPHABETICAL INDEX

PART II

NOTES

Since Metal-Fach Sp. z o.o. is continuously improving its products, and adapting its product range to fit the customers' needs, we reserve the right to modify our products without prior notice. Therefore, we advise contacting an authorised dealer or sales representative of Metal-Fach Sp. z o.o., prior to making your decision about purchase.
Metal-Fach Sp. z o.o. will not accept any complaints regarding the data and pictures contained in the catalogue, as the presented range of products does not constitute an offer within the meaning of the provisions of the Civil Code.

The pictures do not necessarily show standard accessories.

Original spare parts are available from authorised dealers, both in Poland and abroad, and also at the Metal-Fach retail outlet.

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